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ABSTRACT

This district plan for a computer education program contains objectives for grades K-8, course descriptions for grades 9-12, descriptions of three special programs, and data related to computer inventories and budgets. Accompanying the K-8 objectives, which are listed separately for each grade level, are activities/procedures and methods of instructional delivery. The high school course descriptions include objectives, activities, and methods of instruction. The courses, primarily in the business and math departments, include computer survey, data processing, word processing, computer mathematics, and advanced computer programming. The special programs described are EPIC, a program for gifted students in grades 4-8 which incorporates individualized computer instruction; Computer Assisted Remediation Program (CARP) which provides remediation for high school students in mathematics, language arts, and reading; and the Guidance Information System (GIS) which offers occupational information for high school students. The data section lists current and projected inventories of microcomputers in all of the district's schools as well as budgetary information for 1982-1985 for materials and services necessary to support the computer education plan. A four-page glossary of computer terms is appended. (DC)

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ED237084

Computer Education Plan

Bristol Public Schools

K-12

IR020051

January, 1983

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

FOREWORD

This curriculum has been developed through the cooperative efforts of many people from all grade levels and subject areas within the school system. Many administrators and teachers took the time to send information, read rough drafts, share activity ideas, offer positive criticism, and the like.

Thanks go to the original Computer Coordination Committee members who responded to the first calls for assistance and showed their interest and concern for computer education efforts in Bristol. Also, special thanks to the Core Committee members who spent much time and effort individually, or in concert with others, in preparing and reviewing curriculum, incorporating information received, considering opinions and needs of various departments and knowledgeable and concerned individuals in the school system.

I especially note the assistance and effort of Mr. Richard Nolan, Administrator for Instructional Support Programs, who worked with me, a number of times until late evening, on the complexities of this computer plan.

It should be noted that the major purpose of introducing computers into the curriculum is to develop knowledge and skills related to computer literacy and problem solving. Drill and practice are introduced at lower grade levels and utilized throughout the grades and do serve important practical and motivational purposes. However, it is expected that early exposure to drill and practice software programs combined with a sequential program of literacy skills will lead to increasingly high levels of competence in computer programming skills and associated knowledge of computer applications and career opportunities.

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BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Kindergarten

OBJECTIVES:

1. Students will participate in discussions about computers.

2. Students will observe computers in actual use.

3. Students will communicate knowledge of computer appearance use through oral or pictorial presentation.

ACTIVITIES/PROCEDURES:

1. Class visit to room(s) with computers. Also visit classrooms where students are actively using computers.

2. Point out, on off-grounds trips, location of computer activities.

3. Other activities may include:

   a. developing a rebus story about computers;

   b. having a class speaker about computers;

   c. drawing pictures of computers at work (robots, registers in stores and computers in classrooms, etc.).

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by the individual kindergarten teachers.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: One

OBJECTIVES:

1. The students will identify the following three terms:
   a. computer (microcomputer);
   b. T. V. screen (CRT);
   c. keyboard.
2. The students will participate in a discussion about how microcomputers work:
   a. keyboard (in-put activities), example-the pupil locates letters of his/her name on the keyboard;
   b. computer interaction (the students see the result of pressing keys on screen;
   c. recognizing results through a screen display (output activities).

ACTIVITIES/PROCEDURES:

1. Schedule computer for demonstration and discussion of parts and usage and for keyboard practice.
2. Develop pictorial representation of keyboard on ditto sheet for each student. Students circle keys which represent the spelling of their respective names.
3. Students will use computer vocabulary in class discussion and writing.
4. Create "computer corner" demonstrating pictures, photos, articles.
5. Encourage sharing of home computer activities.
6. Teacher may wish to use computer as in objectives 2 a, b, c using words from spelling or reading activities.
7. Teacher may wish to use computer to write numbers and names for numbers, or even number sequences from the regular math curriculum.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by the individual first grade teachers.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Two

OBJECTIVES:

1. The students will be able to demonstrate knowledge of basic keyboard commands (on-off, RETURN, Curser).

2. The student will be able to type an original, one line sentence using the computer keyboard.

3. The student will know that one of the uses of a computer is counting.

ACTIVITIES/PROCEDURES:

1. Schedule the microcomputer for demonstration and keyboard practice.

2. Using the board and paper, practice writing original sentences for entering on keyboard when available.

3. Develop group stories through the construction of sequenced sentences.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by the individual second grade teachers.

RELATED INFORMATION: Note - Teacher may capture student sentences as part of class program list by inserting line number and quotes for each child's sentence, e.g. -

Child 1 - type, 1 Ø "The ball fell"

Child 2 - type, 2 Ø "The dog jumped".

After the last child has entered, the teacher may recall all sentences by typing "LIST" and "return". The students may, however, just simply type their sentence without use of line number or quotes, if preferred by teacher.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Three

OBJECTIVES:

1. The student will demonstrate knowledge of the meanings of the following terms:

   a. microcomputer;

   b. cassette drive;

   c. cassette tape;

   d. memory;

   e. terminal;

   f. Input/Output;

   g. program;

   h. basic keyboard commands of Print, End, " ", line numbers, RUN.

2. The student will be able to write a simple, three line entry program in BASIC (e.g. 1 Ø PRINT "3 + 1" R; 2 Ø PRINT "3 - 1" R; 3 Ø END; 1 Ø PRINT "My name is _____" R; 2 Ø PRINT "Name" R; 3 Ø END.

3. All students will demonstrate ability to load, enter and interact with a math instructional software program.

NOTE: The objective will accomplish two sub-objectives:

   a. Instruction in using software;

   b. Students will be able to use the computer for developing their respective math skills.

ACTIVITIES/PROCEDURES:

1. Schedule the computer for block RUN of time for the class.

2. Draw picture on ditto, have children label parts.

3. Let children practice writing several three line programs for computer entry.

4. Let students practice new keyboard command entries on computer.

5. Let students practice entering three line programs on computer.

6. Select from available software, programs designed to develop math basic skills appropriate for the class.

7. Let students practice entering software program into computer. Allow for student interaction with selected software in math.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by the individual third grade teachers.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Four

OBJECTIVES:

1. The student will demonstrate knowledge of the following terms:
   a. cable;
   b. hardware;
   c. printer;
   d. graphics;
   e. processor;
   f. printout;
   g. programmer;
   h. uppercase (graphics) and the use of shift lock, two CRSR keys and Inst Del key.
2. The student will demonstrate the ability to enter three different graphic symbols into the computer.
3. The student will demonstrate ability to enter and interact with more than one math instructional software program.

ACTIVITIES/PROCEDURES:

1. Schedule the computer for a block of time with the class.
2. Develop and distribute a ditto sheet describing computer parts.
3. Create several original graphic designs in class.
4. Practice new keyboard commands.
5. Practice entering software programs.
6. Continue student interaction with math software.

7. Discuss computer programmer occupations.

8. Practice model programs prepared by teacher or other resources.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by the individual fourth grade teachers.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Five

OBJECTIVES:

1. The student will demonstrate knowledge of the following terms:
   a. bug;
   b. CRT;
   c. CPU;
   d. data;
   e. disk: computer occupations.
2. The student will demonstrate an ability to write a program of six to twelve lines with or without graphics.
3. All students will demonstrate ability to load, enter and interact with a language arts software program.
4. All students will continue to apply abilities to load and interact with various math instructional software programs according to their respective needs.

ACTIVITIES/PROCEDURES:

1. Schedule the computer for a block of time with the class.
2. Develop and distribute a ditto regarding computer terminology.
3. Develop and distribute a ditto regarding graphic symbols construction.
4. Practice commands and simple programming.
5. Practice interaction with computer software.
6. Discuss computer-related occupations (e.g. engineer, systems analyst, etc.)
7. Do class research project in computer applications.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by math and language arts teachers working cooperatively on objectives.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Six

OBJECTIVES:

1. Students will demonstrate ability to use keyboard commands:
   a. let;
   b. go to;
   c. input;
   d. remark.
2. Students will demonstrate the ability to select appropriate instructional software from available materials according to their respective needs (the ability to work independently on the computer in both math and language arts).
3. Students will demonstrate the ability to write at least one of the following:
   a. a short program designed to solve a math problem;
   b. a short essay program for reproduction on the computer;
   c. a short program which uses graphics symbols.
4. The student will demonstrate knowledge of how computers have been used and are being used in the world.

ACTIVITIES/PROCEDURES:

1. Schedule the computer for a block of time with the class.
2. Prepare and use a ditto regarding computer terminology.
3. Prepare and use dittos showing model programs using numbers, words and/or graphic displays.
4. Practice interaction with computer software.
5. Practice program development in math, language arts and graphics.

6. Discuss various occupations (keypunch, cashier, systems design engineer, statistician, etc.).

7. Continue to develop investigations, discussions and special projects related to computer history.

8. Develop lists of and reports on computer activities in the community.

METHOD OF INSTRUCTIONAL DELIVERY: Instruction at this level will be carried out by math and language arts teachers working cooperatively on objectives.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Seven

SUBJECT: Computer Literacy, Math and English

OBJECTIVES:

A. Literacy

1. The student will describe typical examples of different types of computers and peripheral equipment:

   a.) microcomputer - cassette, disk, printer modem

   b.) minicomputer - hard disk, separate terminal, printer modem, monitor

   c.) macrocomputer - tape drive, hard disk, keypunch, monitor, modem, multiplexor.

2. The student will cite a variety of examples of computer usage and careers to illustrate the importance of computers in society.

3. The student will demonstrate an understanding of the capabilities and limitations of microcomputers through the listing of three significant functions (e.g. computation, memory and listings).

B. Math: The student will demonstrate ability to load and successfully respond to basic math programs at the seventh grade level including: addition, subtraction, multiplication, division, fractions, decimals, percents, and algebra (specific programs to be determined according to student need).

C. English: The student will demonstrate ability to load and successfully respond to basic language arts programs such as punctuation, capitalization, sentence structure, paragraph structure, contextual meanings and comprehension in reading.

NOTE: Students who have demonstrated that they have attained the minimum proficiencies for seventh grade computer literacy will undertake individualized computer programs related to seventh grade course objectives (e.g. develop math problem solving programs).

ACTIVITIES/PROCEDURES:

1. View audiovisual slide or film presentations.
2. Visit library for research into computer systems.
3. Complete teacher made dittos regarding computer types and peripherals.
4. Develop student project books (scrapbooks) with cut-outs, stories, photographs, and news articles about computer usage and careers.
5. One or several class speakers to discuss computer capabilities and limitations in different fields.
6. Class visit(s) to various computer sites.
7. Practice interaction with computer software programs in math.
8. Practice program development related to specific math skills being studied.
9. Practice interaction with computer software programs in language arts and English.
10. Practice program development related to specific English skill being studied.

METHOD OF INSTRUCTIONAL DELIVERY: To be carried out by the math and language arts departments under the leadership of the English and Math Coordinators working cooperatively in regard to all objectives.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Eight

SUBJECT: Computer Literacy, Math and English

OBJECTIVES:

A. Literacy

1. The student will be able to describe at least two typical arrangements of microcomputers and peripherals (e.g. dedicated unit and networked unit).

2. The student will be able to write basic arithmetic programs using the following new commands:

a.) if/then

b.) for/next

c.) read/data

3. The student will be able to cite a variety of examples and careers to illustrate the importance of computers as they impact directly on their lives.

B. Math: The student will demonstrate ability to lead and successfully respond to basic math programs at the eighth grade level including: the four basic operations, fractions, decimals, percents and algebra (specific programs to be determined according to student need).

C. English: The student will demonstrate ability to lead and successfully respond to basic language arts and English programs in grammar, punctuation, vocabulary, contextual meanings, comprehension and composition.

NOTE: Students who have demonstrated that they have attained the minimum proficiencies for eighth grade computer literacy will undertake individualized computer programs related to eighth grade course objectives.

ACTIVITIES/PROCEDURES:

1. View slide and film presentations regarding basic computer systems.

2. Visit library for research into computer systems.

3. Complete dittos regarding computer systems.

4. Develop student project books which include pertinent microcomputer information.

5. One or more class speakers regarding the use of microcomputers.

6. Class visit(s) to non-school based microcomputer usage sites.

7. Practice interaction with computer software programs in math.

8. Practice program development related to specific math skills being studied.

9. Practice interaction with computer software programs in language arts and English.

10. Practice program development related to specific English skill being studied.

METHOD OF INSTRUCTIONAL DELIVERY: To be carried out by the math and language arts departments under the leadership of the English and Math Coordinators working cooperatively in regard to all objectives.

EPIC Program

Computer activity was initiated in the EPIC program using a loaned WANG computer. This computer instruction is highly individualized and will continue through the use of the loaned computer and a computer text purchased through special program funds.

EPIC is a program for Intellectually Gifted students. It encompasses grades 4-8. The elementary segment operates as a pull-out program for 1 day per week. The junior high program meets for a minimum of two periods per week. Periodically field trips are scheduled to such places as Talcott Mountain Science Center, Mystic Marine Land, etc.

Computer instruction activity has been, to date, limited to Grades 4-6. The objectives for this portion are:

1. Students will demonstrate knowledge of basic equipment opeation including functional keyboard commands.

2. Students will demonstrate knowledge of and skill in writing and debugging simple BASIC language programs.

3. Students will demonstrate the level of knowledge of computer operation necessary to utilize this equipment in EPIC study units where appropriate.

It is a long range goal of those responsible for Bristol's EPIC program to develop computer related instruction for the junior high school portion of this program. At this point, the objectives and activities still need to be developed. It is, however, anticipated that

a.) a pilot study proposal will be developed for the gr. 7-8 EPIC program with a recommended implementation date of Sept. 1983.

b.) For such a pilot, equipment already planned for each junior high school will be utilized.

Any further expansion at either level will be addressed in a formal proposal to Board of Education through Central Office administration.

General Development K-8

As noted in the high school section, computer requests from various departments will be handled through the pilot study process.

In regard to special education at all levels and future requests coming from departments at the K-8 level, the normal budgetary process will be followed. As required, new program uses will be brought to the attention of the Academic Policy Committee of the Board of Education.

The budget adoption process allows for full review by all Board members, of all requests, thus assuring control over the growth and development of computer education in future years.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Nine
COURSE TITLE: Familiarization
INITIATION: Sept. 1983
Both high schools

DEPARTMENT: Math and Business
CREDIT: Not Applicable
CATEGORY: Not Applicable
PREREQ.: Not Applicable
Sp. Notes: None

NOTE: This program will operate as two week units in computer awareness and will be included in the following ninth grade mathematics and business course offerings:

1. General and Foundational Mathematics
2. Algebra - all levels
3. Accelerated Geometry
4. Business Mathematics

OBJECTIVES:

1. The student will have knowledge of microcomputer equipment and its operation.

2. The student will know the several computer instruction programs available in each department having such offerings.

3. The student will be able to demonstrate elementary interaction with computer hardware and software.

ACTIVITIES:

1. Students will be given ditto representations of computer equipment.

2. Teachers will provide instruction in BASIC command functions.

3. Instruction will be provided in loading and interacting with commercial instructional software.

4. Orientation information will be offered to acquaint students with computer instruction available in grades 10, 11 and 12 by departments (Business, Math, Guidance).

METHOD OF INSTRUCTION:

As noted, this instruction will be integrated into the four courses noted above as two-week units. Technical assistance to all teachers involved will be provided by the appropriate departmental computer lead teacher.

This program will serve as an interim literacy effort until:

a. implementation of the Computer Survey course is complete; and,

b. students from lower grades begin to enter the ninth grade already possessing computer literacy skills.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: Ten
COURSE TITLE: Computer Survey
INITIATION: Sept. 1984
Both high schools

TEXT: Computer Literacy by E. Richman; Random House

DEPARTMENT: Interdepartmental
CREDIT: 1/2 (1 Semester)
CATEGORY: Three
PREREQ.: None
Sp. Notes: 1. Not to be taken by anyone having previous school experiences in Computer Education; 2. Preference given to students in grades eleven and twelve.

COURSE RESTRICTIONS: 1. This course will not satisfy math requirements for graduation. 2. This course will count toward high school graduation.

OBJECTIVES:

1. The student will have knowledge of microcomputer equipment and its operation.
2. The student will know the several computer instruction programs available in each department having such offerings.
3. The student will be able to demonstrate elementary interaction with computer hardware and software.
4. The student will demonstrate knowledge of careers and changing technological needs in automated data processing and general computer technology.
5. The student will demonstrate elementary knowledge of how computers are used in subjects other than math or business.
6. The student will demonstrate elementary knowledge of BASIC language commands (e.g. Run, End, Print, $, ?, Read Data, List, etc.).

ACTIVITIES:

1. Students will be given ditto representations of computer equipment and systems configurations.
2. Teachers will provide instruction in BASIC command functions.
3. Instruction will be provided in loading and interacting with instructional software.
4. Orientations will be provided to students regarding careers, technological changes and other departmental offerings relative to computer education.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 10, 11, 12
COURSE TITLE: EDP I
INITIATION: In Process

DEPARTMENT: Business
CREDIT: 1/2 (1 semester)
CATEGORY: Three
PREREQ.: None
Sp. Note: This course should not be taken with Computer Math I

OBJECTIVES:

1. The student will demonstrate a basic knowledge of and skill in automated Data Processing.

2. The student will demonstrate a basic knowledge of business data management.

3. The student will demonstrate knowledge of careers and changing technological needs in automated business data processing.

4. The student will demonstrate a basic knowledge of the historical development of automated data processing.

ACTIVITIES:

1. Teachers will provide basic instruction in:

   a. information identification

   b. information organizing

   c. information processing.

2. Relate information processing to equipment.

3. Investigate functions of associated equipment.

4. Discuss equipment uses in business settings.

5. Introduce and practice interaction with equipment to perform tasks.

6. Introduce and utilize equipment to perform rudimentary jobs such as:

   a. record keeping

   b. sorting

   c. referencing

7. Discuss career opportunities in automated data processing.

8. Discuss technological changes in automated information processing.

9. Undertake rudimentary projects in ADP which are individualized but related to the accomplishment of business information processing.

METHOD OF INSTRUCTION:

This will be an introductory course offered by the business departments of both high schools. As such, a regular staff member will be assigned to teach each of the needed sections per semester. The course's instruction will use a theory-lab approach.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 10, 11, 12
COURSE TITLE: EDP II
INITIATION: In Process

DEPARTMENT: Business
CREDIT: 1/2 (1 semester)
CATEGORY: Three
PREREQ.: None
Sp. Note: This course should not be taken with Computer Math I

OBJECTIVES:

1. The student will demonstrate intermediate knowledge of and skill in automated data processing.

2. The student will demonstrate intermediate knowledge of business data management.

3. The student will demonstrate an expanded knowledge of careers and changing technological needs in automated data processing.

4. The student will demonstrate an expanded knowledge of the evolution of automated data processing.

ACTIVITIES:

1. Teachers will provide instruction in:

   a. information identification

   b. information organization

   c. information processing.

2. Relate information processing to equipment and prepared software.

3. Refine equipment operation functions.

4. Investigate and discuss various applications of equipment in real office settings.

5. Continue practice of equipment interaction.

6. Review and continue with use of equipment in laboratory job tasks.

7. Continue discussion of career opportunitites in automated data processing.

8. Further discuss technological changes in information processing.

9. Continue with ADP projects.

METHOD OF INSTRUCTION:

This will be a second phase introductory course offered by the business departments of both high schools. A regular staff member will be assigned to teach each of the needed sections per semester. The course's instruction will use a theory-lab approach.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 11-12
COURSE TITLE: EDP III
INITIATION: Sept. 1983

DEPARTMENT: Business
CREDIT: 1/2 (1 semester)
CATEGORY: Two
PREREQ.: EDP II

OBJECTIVES:

1. The student will demonstrate knowledge of and skill in magnetic tape and disk programming techniques.

2. The student will demonstrate knowledge of various computer applications as designed by systems analysts and programmers.

3. The student will demonstrate knowledge of file design (tape or disk).

ACTIVITIES:

1. Investigate and orient students to pseudo-code, program designs and language applications.

2. Investigate and orient students to file organizations, sequential processing and updating.

3. Investigate and orient students to creation of sequential files, random retrieval, language elements and COBOL four divisions (payroll).

4. Assist students in developing self designed and operable programs in billing, inventory, accounts payable and/or banking applications.

METHOD OF INSTRUCTION:

This will be a second phase introductory course offered by the business departments of both high schools. A regular staff member will be assigned to teach each of the needed sections per semester. The course's instruction will use a theory-lab approach.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 11-12
*COURSE TITLE: Word Processing
INITIATION: Sept. 1983

DEPARTMENT: Business
*CREDIT: See - a.) Office Simulation, or
*CATEGORY: b.) Sten. II/Transcription
*PREREQ.: See Sp. Note
Sp. Note: Word processing units have been designed to be integrated with the existing subjects of Office Simulation and Steno II-Transcription. Each unit will be six weeks in length.

OBJECTIVES (Both courses):

1. The student will demonstrate knowledge of major elements of word processing systems.

2. The student will be able to identify and describe features associated with several different word processing systems.

3. The student will demonstrate knowledge of and skill in using word processing equipment in:

   a. office simulation functions; and/or

   b. Steno-Transcription functions.

4. The student will demonstrate knowledge of careers and employment opportunities associated with word processing.

ACTIVITIES:

1. Investigate and practice setting up word processor equipment including handling media, inserting media, sign on/off, key commands, menu commands.

2. Explore, design and create documents, including formating, margin, tab and line information.

3. Explore and practice editing techniques including backspace, strike-over, insert, delete, replace, copy, move and hyphenation.

4. Explore and practice retrieval of prerecorded material - words, lines, paragraphs.

5. Explore and practice printing including sending and call back.

6. Explore and practice filing techniques including procedures, deletions and document retrieval.

METHOD OF INSTRUCTION:

The set of units will be built into both courses noted above which are already offered by both schools' business departments. As such, normal staffing and instructional procedures will be followed.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 10-11-12
COURSE TITLE: Computer Math I
INITIATION: In Progress

DEPARTMENT: Math
CREDIT: 1/2 (1 semester)
CATEGORY: Two
PREREQ.: Alg. I
Sp. Note: Course can be omitted from Computer Math sequence with permission of the department head.

OBJECTIVES:

1. The student will demonstrate knowledge of clarity and precision in tracing program information in the BASIC computer language.

2. The student will demonstrate knowledge of present and future uses of computer oriented systems.

3. The student will demonstrate rudimentary knowledge of how computers are used in subjects other than math.

4. The student will demonstrate knowledge of and skill in the operation of all on-site computer equipment.

5. The student will demonstrate knowledge of and skill in using computers in algebraic calculation and problem-solving.

ACTIVITIES:

1. Investigate the history of computers.

2. Orient and practice using computer equipment including necessary keyboard commands.

3. Investigate, orient and practice using commercial computer math instruction programs, including basic arithmetic functions, algebra and geometry.

4. Investigate concepts involved in flow charting.

5. Practice the development and refinement of flow charts.

6. Investigate rudimentary programming concepts.

7. Practice the development and refinement of student designed programs in math topics.

METHOD OF INSTRUCTION:

This is an introductory course offered by the math departments of both high schools. As such, a regular staff member is assigned to teach each of the needed sections per semester.

RELATED INFORMATION:

This course is designed for the college bound student to introduce him to computers and their uses in various subject areas. Emphasis will be on developing problem-solving techniques using basic algebraic concepts. Use of computer software, flow charting and elementary programming techniques will be emphasized. The development of computer technology and prospects for the future will be discussed.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 10-11-12
COURSE TITLE: Computer Math II
INITIATION: In Progress

DEPARTMENT: Math
CREDIT: 1/2 (1 semester)
CATEGORY: Two
PREREQ.: Computer Math I

OBJECTIVES:

1. The student will demonstrate refined skill competencies in BASIC Language programming.

2. The student will demonstrate refined skill competencies in computer logic and problem-solving techniques.

3. The student will demonstrate knowledge and skill in program alteration and debugging processes.

4. The student will demonstrate knowledge and skill in developing organized, functionally correct programs complete with written instructions.

5. The student will demonstrate knowledge and skill in using computers in advanced algebraic calculation and problem-solving.

ACTIVITIES:

1. Provide a review of BASIC Language construction and operation.

2. Practice developing correct BASIC statements.

3. Investigate, orient and practice using advanced BASIC statements including subscripted variables, string characters, properties and input/output activities.

4. Practice the development and refinement of student designed programs.

5. Have students undertake programming projects which include statistical analysis, Pascal triangle, analytic geometry series and sequences, interpolation, law of sines and cosines, number rounding and other bases.

METHOD OF INSTRUCTION:

This is an intermediate level course offered by the math departments of both high schools. As such, a regular staff member is assigned to each of the needed sections per semester.

RELATED INFORMATION:

This course will emphasize BASIC Language programming. Students will be expected to complete a minimum of 20 programs covering a variety of mathematical topics. Emphasis will be on advanced programming techniques and input/output methods aimed at improving clarity and readability of programs.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 10-11-12
COURSE TITLE: Computer Math III
INITIATION: In Progress

DEPARTMENT: Math
CREDIT: 1/2 (1 semester)
CATEGORY: Cne
PREREQ.: See Sp. Note
Sp. Note: Prerequisites are:
1. completion of Algebra II and Computer Math II; or,
2. permission of the department head

OBJECTIVES:

1. The student will demonstrate advanced knowledge of and skill in the BASIC Language.

2. The student will demonstrate knowledge of computer applications in other academic subjects related to math functions.

3. The student will demonstrate knowledge of careers and employment opportunities in computer technology.

4. The student will demonstrate knowledge of and skill in the application of problem-solving procedures in developing useful computer programs.

5. The student will demonstrate advanced knowledge of utilizing the computer in higher mathematic operations.

ACTIVITIES:

1. Review and practice advanced BASIC Language operations.

2. Review and practice basic tenents of program design.

3. Undertake research activities into careers and employment opportunities in computer technology.

4. Have students undertake research, design, piloting, debugging and refinement of program designed to meet the needs of the school community.

5. Have students undertake program developments which included: file systems, simulations, alphanumeric functions, matric and dimension statements, curve plotting, graphics, calculus applications and other special functions.

METHOD OF INSTRUCTION:

This is an advanced level course offered by the math departments of both

high schools. As such, a regular staff member is assigned to each of the needed sections per semester. (Two theory classes and three lab sessions per week)

RELATED INFORMATION:

This course will examine uses of computers and their application in advanced mathematics, science, and statistical analysis. Students will be expected to develop individual projects to demonstrate applications. Considerable outside research will be required prior to developing programs. Simulations and solutions to problems through the use of computer technology will be discussed. It is recommended that students be enrolled in a college bound science course.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 11-12
COURSE TITLE: Computer Math IV
INITIATION: In Progress

DEPARTMENT: Math
CREDIT: 1/2 (1 semester)
CATEGORY: One
PREREQ.: Computer Math II (see Sp. Note)
Sp. Note: Prerequisites are:
1. completion of Algebra II and Computer Math II; or
2. permission of the Department Head

OBJECTIVES:

1. The student will demonstrate knowledge of COBOL, PASCAL and FORTRAN programming.

2. The student will demonstrate knowledge of the differences between BASIC, PASCAL, COBOL and FORTRAN languages.

3. The student will demonstrate knowledge of applying appropriate language utilization to solve math related problems.

4. The student will demonstrate advanced knowledge of utilizing the computer in higher mathematic operations.

5. The student will demonstrate knowledge of careers and employment opportunities in computer technology.

ACTIVITIES:

1. Provide orientation to the basic concepts of FORTRAN.

2. Investigate differences between FORTRAN and BASIC.

3. Investigate math and problem solving applications of FORTRAN.

4. Provide orientation to the basic concepts of COBOL.

5. Investigate difference between COBOL and BASIC.

6. Investigate math and problem solving applications of COBOL.

7. Investigate PASCAL.

8. Investigate other computer languages.

9. Undertake student projects in developing programs in at least three languages.

10. Undertake research activities into careers and opportunities in computer technology.

METHOD OF INSTRUCTION:

This is an advanced level course offered by the math department of both high schools. As such, a regular staff member is assigned to each of the needed sections per semester. (Three theory classes and two lab sessions per week)

RELATED INFORMATION:

It is intended to give an introduction to programming languages other than BASIC emphasizing techniques best suited to specific languages. Students will be expected to produce programs in several different languages. Students should be competent in BASIC language programming and have a solid mathematical background. This course will also explore career opportunities and advanced schooling in the area of computer technology.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

GRADE LEVEL: 11-12
COURSE TITLE: Advanced Computer Programming
INITIATION: In Progress

DEPARTMENT: Math
CREDIT: 1/2 (1 semester)
CATEGORY: One
PREREQ.: Computer Math IV

OBJECTIVES:

1. The student will demonstrate knowledge of advanced BASIC programming skills.

2. The student will demonstrate knowledge of project-based planning, development, implementation and assessment of computer problem solving applications.

3. The student will demonstrate skill in the responsibility of project completion.

ACTIVITIES:

1. Provide students with minimum requirements of satisfactory projects.

2. Arrange for research sources for student determination of appropriate projects.

3. Assist in establishing critical checkpoints in and management plan for project's development.

4. Monitor student projects at critical points and in spotcheck fashion to insure proper project development.

METHOD OF INSTRUCTION:

This advanced course will function in an independent study fashion in both high schools. As such, students will be assigned to a staff member in case-load fashion. Class periods will be scheduled periodically to ensure proper development of student activities.

RELATED INFORMATION:

This is a project-oriented course which emphasizes individual student projects. Students will be expected to develop programs for use in various subject areas and in other school applications. Each student will be expected to complete one program for every ten days of scheduled class time.

BRISTOL BOARD OF EDUCATION

COMPUTER EDUCATION PLAN

SPECIAL HIGH SCHOOL PROGRAMS

A. Computer Assisted Remediation Program:

This program provides remediation in Math, Language Arts and Reading. Enrollment in the program is required of all students who fail the Ninth Grade Proficiency Test as given by the State of Connecticut. It operates for all students in grades ten through twelve, provided the concerned student qualifies. CARP operates in both high schools in an interdepartmental fashion and is administered by the Office of Development and Instructional Support.

The Computer Assisted Remediation Program has become a major component of Bristol's required high school EERA Remediation Plan. Students receive 1/2 credit for satisfactory completion of the course requirements. There is no prerequisite other than difficulty with the Ninth Grade Proficiency Test.

OBJECTIVES:

1. The student will demonstrate knowledge of and skill in basic math, language arts and/or reading concepts and skills.

2. The student will demonstrate knowledge of and skill in using computers and appropriate instructional software in remediating skill deficits in one or more of the affected subjects.

B. GUIDANCE INFORMATION SYSTEM:

This program, developed during the 1981-1982 school year, is a guidance support effort. It relies on using terminals to access a time-shared program offered by the Area Cooperative Educational Services agency. It provides students with extensive information about occupations, two and four year colleges, armed services occupations, graduate school particulars, financial aid and Connecticut Apprenticeship information. A new feature this year allows this system to be an extension of the Connecticut Jobs Bank File. In short, students will now be able to locate available jobs throughout the state and obtain all necessary particulars relative to each opening.

OBJECTIVES:

1. The student will demonstrate knowledge of and skill in using the Guidance Information System.

2. The student will demonstrate knowledge of selected occupational and preparatory information related to individualized career planning.

3. Where appropriate, the student will demonstrate knowledge of available job openings pertinent to his/her career plans.

OTHER DEPARTMENTS

Use of computers in instructional areas other than math and business will be on a pilot program basis. The department head, principal and individual teacher will jointly develop pilot units with well defined and measurable objectives. This will allow for the determination of the instructional effectiveness of any such pilot studies.

Because these pilot studies will be relatively short in duration, equipment support will be acquired from either the business, math or other special programs that may be approved by the Board of Education. Joint evaluations of such projects will take place by the concerned department heads of both high schools. Recommendations resulting from these assessments will be forwarded to the curriculum councils of both high schools with their recommendations being sent to the central office staff of the district. If approved, proposals will then be brought as recommendations to the Academic Policy Committee of the Board of Education.

Teachers in all departments other than math and business will be encouraged to become familiar with appropriate equipment and software as time, interest and resources allow.

Presently, the science department of BCHS is using computers for instructional purposes. Under the Computer Education Plan, this use will be continued as a pilot program to permit full investigation, by both high schools, of the possible adoption of Science Computer Education.

Computer Assignment and Use for 1982-1983

The Core Committee recommends that the computers not currently assigned to schools be used for specific inservice training activity and be available for teacher/administrator practice and familiarization for the remainder of the 1982-1983 school year. They will then be assigned for instructional purposes according to the allocation plan for 1983-1984 as noted elsewhere in this plan.

The actual location of the computers for the remainder of 1982-1983 will in large measure be determined by the particular inservice approach selected by the Board of Education in connection with the adoption of this Computer Education Plan.

Allocation of Computers for 1983-1984 (K-8)

	Estimated Total Sections gr. 3 - 6	Existing Prior Sept.	83-84	Total
Bingham	8	0	2	2
Edgewood	11	0	3	3
Greene-Hills	12	1	2	3
Hubbell	9	0	3	3
Ivy Drive	14	0	4	4
Jennings	9	0	3	3
Mtn. View	12	0	3	3
O'Connell	8	0	2	2
South Side	13	1	3	4
Stafford	8	0	2	2
Northeast		1 *	7	8
Mem. Blvd.		0	8	8
		3	42	45

45 to be assigned to specific schools
5 Available for citywide scheduling, inservice training, emergency replacement
50 Total at the K-8 level **

* from West Woods

** 3 in K-8 schools prior to Sept. 1982
37 Title IV computers to be used in 1982-1983 for training and subsequent assignment to K-8 schools
10 to be purchased with currently budgeted funds; to be assigned to schools (5) and used for inservice training and emergency replacement (5)
50 Total computers at the K-8 level

Computer Related Instructional Inventory
High Schools, 1982-1983

	Printers	Micro-Computers	Cassettes	Disk Drives	Other* Units	Word Processors
Business Education						
BEHS - DP	0	5	5	0	4	0
BCHS - DP	2	9	5	1	4	0
BCHS - BOE	0	1	1	0	0	0
EEHS - DE		1	1			
CARP						
BEHS	1	10	4	3	0	0
BCHS	1	11	3	3	0	0
Math						
BEHS	1	8	6	1	0	0
BCHS	0	4	3	0	2	0
Music						
BEHS (Mr. Ferris' computer)	1	1	1	1		
Science						
BCHS		2	2			
Total High School Instructional	6	52	31	9	10	0

* "Other" includes the unused on-line terminals, NCR 7500, Printers for on-line terminals.

High School Computers, 1982-1983 Needs

	Micro-computers	Cassettes	Disk Drives	Printers	Word Processors	Supplies & Materials
Gr. 10, 11, 12						
Office Simulation	1 #8032-CH (Voc. Ed)	1-CH (Voc. Ed)				
Data Processing I, II	1 #4016-EH (Voc. Ed)					
	1 #4016-CH (Voc. Ed)	2-CH (Voc. Ed)	1-CH (Voc. Ed)			
Distributive Ed.	1 -CH (Voc. Ed)					

High School Computers, 1983-1984 Needs

Gr. 9						
Introductory Unit in Math & Business	No additional equipment needed					
Gr. 10, 11, 12						
Business Steno/Transcription					2-BEHS 2-BCHS	
Office Simulation					3-BEHS 3-BCHS	
Data Processing I, II	4-BEHS	3-EH	2-EH 1-CH	2-EH		
Math	2-BEHS 5-BCHS	4-CH	1-CH			

High School Computers, 1984-1985 Needs

Gr. 9						
Interdepartmental Computer Literacy	5-BEHS 5-BCHS	5-EH 5-CH				
Pilot Programs, Staff, Inservice, Emergency Replacement	5-BEHS 5-BCHS					

SUMMARY

Current and Projected Inventory 1982-1985

	Printers	Micro-Computers	Cassettes	Disk Drives	Other Units	Word Processors
1982-1983						
Existing Title IV computers to be used for inservice training and assignment to K-8 schools		37				
Existing Budgeted Funds to be purchased K-8 level		10				
Existing (prior Sept. 82) K-8 schools		3				
Existing-High School level	6	52	31	9	10	0
Existing-High School (Voc. Ed funds)		4	3	1	0	0
1983-1984						
To be purchased-high schools	2	11	7	4	-	10
1984-1985						
To be purchased-high schools		20	10			
Projected totals for June 1985	8	137	51	14	10	10

COMPUTER EDUCATION PLAN
Supplies and Materials Request Projections

1982-1983

Budget allocations include:

Elementary	None		-
Secondary			
CARP	$500/school	(local)	$ 1,000
DP	$284	(Voc. Ed.)	284
Total			$ 1,284

1983-1984 Plan Projections

Elementary			
K	-		$ -
1	-		-
2	-		-
3	$ 90/section - 12 sections		1,080
4	$ 90/section - 12 sections		1,080
5	$110/section - 29 sections ($70 Math, $30 L. A., $10 blank)		3,190
6	$110/section - 27 sections ($70 Math, $30 L. A., $10 blank)		2,970
Subtotal			8,320
Junior High			
7	$600/school-2 schools ($300 Math, $200 L. A., $100 blank)		$ 1,200
8	$600/school-2 schools ($300 Math, $200 L. A., $100 blank)		1,200
Subtotal			2,400
High School			
9	Interdepartmental Familiarization Units		-
10-11-12	Business Courses, includes: EDP I, EDP II, EDP III, Steno/Transcription and Office Simulation (5)		
	-cassette tapes and disks, $100/school		$ 200
	-paper and ribbons, $500/school		1,000
	-textbooks-100 ($15/copy)/school		3,000
10-11-12	Math courses, includes: Comp. Math I, Comp. Math II, Comp. Math III, Comp. Math IV, Advanced Comp. Prog. (5)		
	-tapes, disks, ribbons, paper $500/school		1,000
	-textbooks-100 ($10/copy)/school		2,000
	Subtotal		7,200
Other			
CARP - Assorted commercial $500/school			$ 1,000
Total			$ 18,920

1984-1985 Projection

Due to the durability of software and texts, the anticipated costs for the second year of the computer plan would be reduced to approximately $6000. This sum would be used for the purchase of blank cassettes, disks, paper, ribbons, and some selected commercial programs.

At this time, the distribution of such purchases would appear likely to be:

Elementary (K-6)	$ 1,000
Junior High (7-8)	2,000
Senior High (9-12)	3,000
Total	$ 6,000

1985-1987 Projection

At this early stage in the development of our plan, it appears possible that comparable expenditures would be needed by the schools, each year, as will be experienced in the third year (1984-1985) of implementation. It also appears likely that the same distribution pattern as noted above will hold.

Maintenance

As part of this plan there will be a need to provide maintenance for computers and computer related equipment to keep the equipment operating and, thereby, protect the Board of Education's investment in this area.

Thus far our needs have been minimal in regard to repair of equipment. As time goes on, however, we anticipate the age of the equipment will cause more breakdowns, which will require an adequate maintenance budget.

Estimated Requirements:

1982-1983 Expected Costs, parts and labor	$ 1,500
106 computers:	
52 High School	
4 High School (Voc. Ed. funds 82-83)	
37 K-8 (Title IV)	
3 K-8 (Existing, prior Sept. '82)	
96	
10 K-8 (82-83 local funds)	
1983-1984 Expected Costs, parts and labor	$ 4,445
127 computers x 1 hr. x $35 per/hr.	
1984-1985 Expected Costs, parts and labor	$ 5,145
147 computers x 1 hr. x $35 per/hr.	

Inservice

This plan expects all teachers to have a sufficient level of computer knowledge and training to implement and fulfill the computer education objectives at their respective levels.

We consider the following to be the minimum training requirements:

1. For teachers grades K-8 -

   A two hour introductory course covering terminology and basic equipment operation. Also, an explanation of the computer education curriculum will be provided.

2. For teachers grades 3-6 -

   A two hour practice session including utilization of computer equipment and peripherals related to curriculum objectives. This will include BASIC programming skills.

3. For math and language arts teachers 7-8 -

   A two hour session concentrating on BASIC programming skills.

If adopted, this plan will require a means of training teachers within the context of contractual obligations.

Budget Perspective 1982-1985

1982-1983

Equipment			
Microcomputers & Word Processors	10 @ 600 ea. =	$ 6,000	
Disk Drives	1 @ 1300 =	1,300	
Cassettes	10 @ 100 ea. =	1,000	
Printers	1 @ 1300 =	1,300	
			$ 9,600
Supplies and Materials			400
Maintenance			1,500
Inservice			3,050
			$ 14,550 *

*NOTE: This amount has already been appropriated in the 1982-1983 Board of Education budget accounts.

1983-1984

Equipment			
Microcomputers & Word Processors	21 @ 900 avg. =	$ 18,900	
Disk Drives	4 @ 1300 ea. =	5,200	
Cassettes	7 @ 100 ea. =	700	
Printers	2 @ 1300 ea. =	2,600	
			$ 27,400
Supplies and Materials			
K-8		$ 10,720	
9-12		7,200	
CARP		1,000	
			18,920
Maintenance			4,445
Contracted Services			
GIS (lease access to information base)		$ 1,500	
Telephone, etc.		250	
			1,750
Inservice (est.)			3,050
			$ 55,565

1984-1985

Equipment			
Microcomputers & Word Processors	20 @ 600 ea. =	$ 12,000	
Cassettes	10 @ 100 ea.	1,000	
			$ 13,000
Supplies & Materials - Estimated K-12			6,000
Maintenance - 147 x $35/hr x 1 hr. avg.			5,145
Inservice (est.)			3,050
Contracted Services			
GIS		$ 1,500	
Telephone, etc.		250	
			1,750
			$ 28,945

BRISTOL BOARD OF EDUCATION

OFFICE OF DEVELOPMENT AND INSTRUCTIONAL SUPPORT PROGRAMS

GLOSSARY OF COMPUTER TERMS

INTRODUCTION:

The following terms have been catagorized into four conceptual groupings. It is anticipated that this organizing effort will promote better understandings of existing computer terminology. This list is not all inclusive; and, obviously, as the technology advances, new terms will develop.

Trade names as well as common generic terms have been included. Two definitions need to be offered before reviewing the more specific, catagorized terms. These are:

COMPUTER: Any machine that performs sequences of internally stored instructions to accept information, apply prescribed processes to it and supply the result of these processes.

COMPUTER LITERACY: The ability of a person to know about and/or to work with computers in a functional manner.

PART I EQUIPMENT:

Computer equipment, often called hardware, is any machine or related item that performs electronic and/or electromechanical functions. Specific terms include:

APPLE II: A brand of a microcomputer often used in schools. This type of computer has the ability to produce color, graphic and audio output.

ATARI: A brand of a microcomputer which also offers gaming software. This company has also made cooperative arrangements with S.R.A. for instructional software.

CABLE: A bundle of insulated wires for carrying electrical current and/or electronic signals.

CASSETTE: One method of storing microcomputer information and programs. This is used in conjunction with a tape recorder.

CHIP: A very small, square electronic circuit which contains all the necessary elements to process information.

COMPONENT: A single part or unit of several items which, when put together, allow a computer to function completely as designed.

CENTRAL PROCESSING UNIT (CPU): The basic, elemental functioning unit of a computer system. In a microcomputer, the CPU may be on a single chip, or these may be "stacked" to allow for greater processing and storage ability.

CATHODE RAY TUBE (CRT): A term often applied to microcomputers which allow for a visual display of information on a video screen.

DISK DRIVE: A machine that reads and transmits information from a floppy disk to and from a CPU unit. This is a preferred alternative to using cassette processing.

FLOPPY DISK: One method of storing microcomputer information and programs. Basically, it is an electromagnetic record. It must be used with a disk drive unit.

HARDWARE: The term applied to any machine or related equipment used in a computer system.

MACHINE: Another term often applied to and used in place of CPU and/or microcomputer.

MAIN FRAME: A very large capacity computer. These usually possess unlimited amounts of storage ability and are extremely costly.

MEMORY: A term applied to the physical capacity of storage inherent within a particular computer's design. This is usually expressed as 16K, 32K or 48K. This term also refers to the place where information is stored within a program or CPU.

MICROCOMPUTER: A small computer with a miniaturized central processing unit. These possess limited storage capabilities but are the least expensive types of computers.

MINICOMPUTER: A mid-range storage capable computer which has a moderate to expensive price tag.

MODEM: A device which allows a computer to use telephone signals to communicate with a remote terminal or computer.

MULTIPLEXOR: A device which allows for the switching of telephone connections. Used in computing to allow remote microcomputers to gain communication access to larger computers.

PERIPHERAL: Any piece of equipment used in conjunction with a CPU. For example, modems and printers are peripheral equipment to a video display terminal.

PET: This is another brand name for a microcomputer manufactured by the Commodore Company.

PRINTER: Any computer terminal or peripheral equipment that produces output printed on paper.

STATION: This term usually refers to a complete equipment arrangement so that a person can interact with the computer.

STORAGE ABILITY: Storage relates to the memory ability of a computer. This is expressed in "K" values. For instance, 16K means that a computer can retain a maximum of 16,000 kilobytes of information.
- Byte = a single symbol, letter or number expressed on a screen or paper.
- Kilobyte = 1,024 bytes.
- Bit = one unit in the sequence needed to express a single symbol, letter or number.

TERMINAL: The complete device needed in order to interact with the computer. This is usually comprised of the keyboard, the CPU and a display unit.

TEXAS INSTRUMENTS (TI): Another brand name for computers and related electronic equipment.

TRS-80: Yet another brand name for a popular computer manufactured by the Radio Shack Corporation.

VIDEO DISPLAY TERMINAL (VDT): A unit that allows for the visual display of information. This may be part of a microcomputer or it can be discreet, such as a TV set.

PART II COMPUTER INTRUCTIONS:

In that the computer is just a machine, it must have direction. This is done through the converting of human thinking to a numerically based series of electronic messages. The way these messages are constructed becomes the computer language. There are a variety of such languages. Fundamental types are:

AUTHOR LANGUAGE: A simplified programming language designed for teachers to use in developing computer-based instructional materials.

BASIC: This is the most common language used to write programs for microcomputers. It literally means, "Beginning All-Purpose Instruction Code".

COBOL: A computer language most often used for business applications. It means, "Common Business Oriented Language".

DIALOGUE: This refers to the process of obtaining stored data from computers through interacting with the equipment and stored information.

FORTRAN: A programming language which makes optimal use of memory space. This is often used in scientific applications.

INPUT: This refers to the information that a user gives to a computer. This is most often done through a keyboard.

INTERACTIVE COMPUTING: This is the process whereby the user asks for or gives the computer information through a dialogue method.

INTERFACE: The process of communication between pieces of equipment and/or users.

LANGUAGE: This is defined as the collective set of instructional procedures that comprise a computer program. Examples are: BASIC, COBOL and FORTRAN.

LOGO: This is a simplified programming language especially used with young children.

OUTPUT: The informational response to a user's instructions which may be printed on a screen or on paper.

PASCAL: A very sophisticated computer language designed mostly for business applications.

PILOT: Another simplified language used with children. This makes extensive use of graphic displays.

PROGRAM: This critical term is defined as the sequence of instructions, given in a language the computer can understand, which describe the processes the computer is to perform.

RAM: This term refers to the random access memory found within a computer. This is the storage space available after the elimination of ROM (see below).

ROM: This refers to the read-only memory of computers. The term represents the storage space used for the basic operating instructions for the computer. This is usually set by the manufacturer.

SOFTWARE: A term applied to the information contained on tapes or disks.

PART III COMPUTER SYSTEMS:

This concept refers to the manner in which computers are set-up to process information. The terms associated with this concept are:

BRANCHING: A means by which the computer refers the student to a specific activity, in a series of activities, based on responses to key questions. This term can also refer to one of a series of "slave" computers to a master drive unit.

BUG: A term refering to a problem in getting a data processing unit operational.

DEDICATED: This refers to a limitation placed on a computer to a particular operation or method of operating.

NETWORK: An arrangement of computer units so that a drive machine operates the processing of other, "slave" units.

ON-LINE: A method of connecting limited capacity computers to larger computers. This is usually done through the use of telephone connections.

TIME-SHARING: Concurrent use of one computer by a number of users. This is accomplished through the division of time available on the main computer.

PART IV COMPUTERS IN EDUCATION:

While the use of computers in education is a fairly recent development, a variety of terms have come into common use. These are:

COMPUTER ASSISTED INSTRUCTION (CAI): Any instructional material that a student gains access to through the use of a computer.

COMPUTER ASSISTED TESTING (CAT): Tests that are generated, administered and/or scored through the use of a computer.

COMPUTER-MANAGED INSTRUCTION (CMI): The use of the computer to mange the instructional process. This may include testing, diagnosis, prescription of materials or activities and/or the maintenance of student records.

COMPUTER GRAPHICS: Picture and line drawings generated by the computer and displayed on a screen, printer or a special plotter.

COURSEWARE: A term applied to a series of computerized instructional programs built upon a major topic of learning.

DRILL AND PRACTICE: A type of program that presents students with practice programs, checksreplies and provides each with information about their respective performance.

PROBLEM-SOLVING: A computer program presenting alternative decision possibilities along with correct responses.

SIMULATION: A computer method which allows the user to manipulate events to see projected consequences of decisions.

TUTORIAL: A systematic presentation of new information through the use of the computer.

WORD PROCESSING: A type of computer program that permits the user to type in textual information, edit it, format it, store and recall corrected copy.